

REMARKS/ARGUMENTS

Favorable reconsideration of this application, as presently amended and in light of the following discussion, is respectfully requested.

Claims 1-11 are currently pending, Claims 1-10 having been amended, and Claim 11 having been newly added. The changes and additions to the claims do not add new matter and are supported by the originally filed specification, for example, on original Claim 10, page 29, line 24 to page 32, line 21, and Figures 8-11.

In the outstanding Office Action, Claims 1 and 10 were rejected under 35 U.S.C. §102(b) as anticipated by Legall (U.S. Patent No. 5,761,398); Claims 1-6 and 8-10 were rejected under 35 U.S.C. §102(e) as anticipated by Butter et. al. (U.S. Patent No. 6,549,575 B1, hereafter “Butter”); and Claim 7 was rejected under 35 U.S.C. §103(a) as unpatentable over Butter in view of Sullivan et al. (“Rate-Distortion Optimization for Video Compression”, Gary J. Sullivan et al, IEEE Signal Processing Magazine, November 1998, pp. 74-90, cited by IDS, hereafter “Sullivan”).

With respect to the rejections of Claim 1 under 35 U.S.C. §102(b), Applicants respectfully submit that the amendment to Claim 1 overcomes this ground of rejection.

Amended Claim 1 recites, *inter alia*,

determining motion vector search ranges
respectively within the plurality of reference frame images
based on a plurality of size-reduced reference images
reduced in size corresponding to the size-reduction ratio of
the size-reduced block by detecting motion vectors
respectively within the plurality of size-reduced reference
images and increasing a size of the motion vectors by linear
interpolation to determine motion vector search ranges with
respect to the plurality of reference frame images which
correspond to an increased size of the motion vectors.

Applicants respectfully submit that Legall and Butter fail to disclose or suggest these features of amended Claim 1.

Legall is directed towards a 3-stage hierarchical motion vector determination in which each stage uses a higher resolution macroblock (see col. 10, line 26 to col. 11, line 5). Figure 4B of Legall shows a process where in each stage of the hierarchy, a macroblock is decimated into macroblocks of smaller sizes (see steps 100 and 106). The decimated macroblocks are used as targets for obtaining a frame based motion vector in each stage of the hierarchy (see col. 10, lines 34-44).

The Office Action takes the position that the decimated macroblocks described in Legall are search areas that correspond to the claimed search ranges of original Claim 1 (see Office Action, at page 2). Legall describes that the macroblocks will be decimated into predetermined sizes such as 4 x 2 pixels or 4 x 4 pixels. However, Legall does not describe that a search range is determined “by detecting motion vectors respectively within the plurality of size-reduced reference images and increasing a size of the motion vectors by linear interpolation to determine motion vector search ranges with respect to the plurality of reference frame images which correspond to an increased size of the motion vectors,” as defined by amended Claim 1.

Therefore, Applicants respectfully submit that amended Claim 1 (and all associated dependent claims) patentably distinguishes over Legall.

Butter is directed towards a method of hierarchically searching a reference picture to find a suitable macroblock for constructing a motion vector between the reference picture and a current picture. In performing the search, Butter describes a hierarchical search unit 201 in Figures 5 and 6 that performs a search using down-sampled data. Butter also describes that different down-sampling ratios can be used, such as 4:1, 2:1, and 1:1. Each of these ratios allow for using different size search windows per unit (see col. 7, lines 18-34).

The Office Action takes the position that the search windows described by Butter correspond to the claimed search ranges (see Office Action, at page 3). As discussed above,

Butter describes that these search windows are determined by the available down-sampling ratios. However, Butter fails to disclose or suggest that a search range is determined “by detecting motion vectors respectively within the plurality of size-reduced reference images and increasing a size of the motion vectors by linear interpolation to determine motion vector search ranges with respect to the plurality of reference frame images which correspond to an increased size of the motion vectors,” as defined by amended Claim 1.

Therefore, Applicants respectfully submit that amended Claim 1 (and all associated dependent claims) patentably distinguishes over Butter.

Sullivan has been considered but fails to remedy the deficiencies of Butter and Legall with regards to amended Claim 1. Therefore, Applicants respectfully submit that amended Claim 1 (and all associated dependent claims) patentably distinguishes over Legall, Butter, and Sullivan, either alone or in proper combination.

Amended independent Claim 10 and new independent Claim 11 recite features similar to those of amended Claim 1. Therefore, Applicants respectfully submit that Claims 10 and 11 patentably distinguish over Legall, Butter, and Sullivan, either alone or in proper combination.


Consequently, in light of the above discussion and in view of the present amendment, the outstanding grounds for rejection are believed to have been overcome. The present application is believed to be in condition for formal allowance. An early and favorable action to that effect is respectfully requested.

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